MUREP Small Business Technology Transfer (M-STTR) Planning Grants

Title: Embedded optical sensors enabled by additive manufacturing for in-situ measurements in propulsion flows

Institution: University of Texas, San Antonio

City/State: San Antonio, Texas

PI: Daniel Pineda, Ph.D.

FY: 2022

SUMMARY:
In the proposed effort, The University of Texas at San Antonio (UTSA) will work with small business partner OptoKnowledge Systems, Inc. (OKSI) to develop plans for SBIR/STTR submissions that will address the need for embedded in-flight optical sensors in harsh propulsion flows. By combining the expertise of the PI Pineda (combustion, absorption spectroscopy, diagnostic development) with that of Co-I Kriesel (diagnostic development, SBIR/STTR management and technology transition), the team will be well-positioned to compete for future SBIR/STTR funding opportunities while developing a long-lasting partnership. With this planning grant, **we will leverage recently-installed metal additive manufacturing capability at UTSA** to develop proposal concepts exploring both passive and active thermal management strategies for directly-embedded optics and photonics, with the aim of developing multiple interfaces for highspeed in-situ propulsion diagnostics with sustained operation lifetimes exceeding several hours.
The advanced diagnostic technology-translation expertise at OKSI combined with the **unique diagnostic evaluation capability at UTSA** provided by multiple impulse facilities with well-controlled or -known thermodynamic conditions (**high-enthalpy shock tube, optical gas cells, and detonation tube**) will accelerate the testing and evaluation of novel embedded sensor architectures with specific application to in-flight sensing of NASA-relevant harsh propulsion flows.